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LEONARDO THINKS

Opinion: Intersenses

ISSN No: 1071-4391

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Originally published in: *Leonardo* Vol. 32, No. 1 (1999), pp. 1-4

Print: ISSN 0024-094X, Online : ISSN 1530-9282,

DOI: <http://www.jstor.org/stable/1576618>

Most forms of art are traditionally linked to one of our senses-music to hearing, painting to sight-but if we examine how art affects us beyond the original stimulus this sense provides, the correspondence between art and the senses becomes more complex. For example, Berenson wrote about the power of imagery in paintings:

I see two men wrestling, [but] if my visual images do not turn into kinesthetic images ... I shall not be more moved than if I heard someone say, "Here are two persons wrestling." .. Tactile values and movement, these are the essential elements in the art of drawing, and a painting is valid (apart from the idea or the subject) only if it determines in us sensorial ideas of touch and of movement [1].

Thus, at least some paintings contain what can be called "kinesthetic images." Furthermore, the hands of a painter do not need to be guided by his sight while he is painting: they can "see," so to speak. Conversely, the eyes of the beholder of a painting have the impression of touching the texture of the paint [2]. In science, similarly, abstract formulas refer to an initial scientific intuition that is often of a kinesthetic nature. Einstein complained of the extreme difficulty he encountered in translating into words and formulas his scientific thought, which occurred to him in terms of images and muscular tensions [3]. As French biologist Jacques Monod has noted: "Every scientist probably realizes that his reflection at the deepest level is not verbal: it is an imaginary experience made in terms of shapes, forces, interactions" [4].

Composers at the Music and Informatics Laboratory of Marseille (MIM), conducting research on the ways electroacoustic and instrumental music are perceived, determined 19 different ways in which portions of music progress in time to convey specific dynamic impressions or meanings. These researchers called these different ways *temporal semiotic units* (USTs) [5], with the word "semiotic" indicating that the units convey meaning, and the word "unit" implying that, like an atom, it does not retain its meaning if subdivided. The researchers provide a precise morphological description of each UST, along



with a name for each that evokes its meaning, for example, "turning," "falling," "contracted-extended," "impulse," "gliding" (*en suspension* in French) and "heavily." Clearly, each of these names also evokes a kinesthetic image. UST terminology can perhaps provide an approach to music similar to Bachelard's approach to poetry using the four elements of alchemy-art, water, earth and fire (which Bachelard considered to be as significant to poetry as they are meaningless to chemistry). This comparison is particularly appropriate if we note that, according to Bachelard, these elements correspond to specific motions:

Imagination is above all a kind of spiritual mobility, the greatest, quickest, liveliest type of spiritual mobility. When one studies a poetic image one should systematically study its movement.... Very often the mobility of an image is specific.... One could have for each image a holograph, so to speak, which summarizes its kinetic aspect.... [6]

According to Jean-Paul Sartre, mental images are actually impressions of movement perceived as images [7]. Coming back to the correspondence between UST terminology and the four elements, "turning" can evoke a whirlpool or whirlwind and can thus be linked to water or to air; "impulse" can evoke jumping flames and is thus linked to fire; "gliding" evokes the air; and "heavily" clearly evokes the earth. If we now look at examples in paintings: those of Paul Rubens, with their fluid composition and transparent colors, can be linked both to the UST "turning" and to the element water; those of El Greco, with their quick, colorful, upward strokes like flames and compositions that lead upward, evoke both the UST "impulse" and the element fire, as do the strokes of Hans Hartung's paintings. Jean Dubuffet's use of thick and heavy paints and earthy colors evokes the UST "heavily" and the element earth; and the paintings of Giovanni Tiepolo and James Turner, as transparent and as seemingly weightless as air, evoke both this element and the UST "gliding." Note that time is not only an essential element in music, but also in painting—in particular in the kinesthetic images of a painting (time in painting could be called "virtual" time, in contrast to the real time in which music is heard) and also in the movements of the painter, which a painting retains, so to speak, and in the movements of the eyes of the viewer. "A painting will not be looked at passively in a single glance, but recreated, . . . redone in the mind of the onlooker," wrote Dubuffet [8]. Berenson's writing, cited at the beginning of this text, also points to the importance of movement in painting.

It thus seems that at this level of comprehension the senses are essentially different paths that lead to various muscular sensations. The correspondence between different art forms at this level then becomes quite natural. A drawing or painting can be used as a score for a musician [9]: he or she can travel in it, go this way and that way, sometimes faster, sometimes slower when the painting becomes more detailed and complex. Conversely, when a painter wishes to express music, rhythm is the most obvious element that can be perceived by the onlooker. Obviously one should consider a deeper level still: if some correspondence can be established between muscular, visual and aural sensations, it is because each refers to processes that occur in the brain.

Of course, other elements exist that correspond to each of the senses. Some have obvious equivalents in more than one sense simultaneously (texture, for instance), while others are specific to just one sense (for instance, color in



relation to sight). The correspondence between color and music is less obvious, but there are similarities (I am not referring to formal, meaningless correspondences such as comparing the wavelengths of a sound and a color). Some musicians (Messiaen, for example) see colors corresponding to certain sounds, and some painters hear the harmony of the colors they place on a canvas. Van Gogh spoke of the "high yellow note," and Kandinsky insisted on both the individual characteristics and the basic, inner similarities of each art form [10]. Above all, the color of a mental image-that is, the expression of an emotional atmosphere [11]-has an equivalent means of expression in every art form. One should not try to codify such correspondences, but-along with the previous considerations of kinesthetic images-these correspondences can be a basis for associating diverse art forms (Fig. 1), for translating one medium into another [12] and for combining them interactively in multimedia works of art. These considerations can be applied to the notation of music, a problem that is particularly acute in electroacoustic music, with its use of a continuous range of sound and subsequent anti-notational nature.

The correspondences discussed here are intuitive. Other correspondences between works of art are more structural [13]: for example, religious art's symbolic link to theology and the structural links between James Joyce's *Ulysses* and the Greek epic for which it is named. Pierre Boulez describes similar structural relationships between music and the paintings of Paul Klee [14]. However, the roles of structure in music and painting are different: musicians usually need explicit structures for their works, whereas painters rely on implicit structures of which they are not necessarily aware. For instance, when composers wished to replace tonal music, they invented dodecaphonic (twelve-tone) music, which has rules at least as rigid as those of tonal music, whereas when painters invented cubism, they discarded perspective but did not replace it with new rigid rules. This difference in the use of rules entails different relationships to the sciences and, in particular, to mathematics [15]. I should also emphasize that the role time plays in the visual arts becomes apparent when one produces a work that includes both music and painting. The lengths of time necessary to view a painting or to hear music are quite different-this difference causes serious difficulty when one wants to produce a joint work. Again, this problem is perhaps linked to the use of explicit musical structures that need time to be fully developed and to be heard. In any case, composers and choreographers can rightfully claim to master time in a particularly subtle and precise way.

Making paintings from music-that is, paintings that refer to something other than the paintings themselves-is similar to making a figurative painting that refers, for instance, to a landscape. On several occasions [16,17] I have compared the relationship between abstract and figurative art to the relationship between mathematics and physics. Mathematics is the expression, invention or discovery of structures, and physics is the application of these structures to reality. Similarly, painters who make abstract art express their inner structures or visual vocabulary directly, while those making figurative art apply these structures to reality. Just as trying to express new physical phenomena obliges theoretical physicists to enrich their mathematical vocabularies (Newton invented integrals to allow him to express his theory of gravitation), so can figurative art challenge painters to enrich their abstract vocabularies. Similarly, the representation of music can be an enriching experience for painters by leading them to expand their vocabulary of shapes



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and structures. This mechanism is well known to musicians who have adapted their vocabulary to a given theme or who have invented a new vocabulary while creating an opera. The challenges and constraints an artist faces while using one work of art to produce a corresponding one in another medium can force the artist to expand his or her creative vocabulary.



Endnotes

- [1] Bernard Berenson, *Les Peintres Italiens de la Renaissance* (Paris: N.R.F., 1953) p. 97.
- [2] Jacques Mandelbrojt, "Voir avec les mains, Toucher du Regard," in *Les Cinq sens de la création* (Seysssel, France: Ed. Champs Vallon, 1996).
- [3] Jacques Hadamard, *The Psychology of Invention in the Mathematical Field* (New York: Dover, 1954) Appendix 1.
- [4] Jacques Monod, *Le Hasard et la nécessité* (Paris: Le Seuil, 1970) p. 170.
- [5] *Les Unités sémiotiques temporelles* ouvrage collectif (Marseille: Editions le MIM, 1996). MIM can be contacted via E-mail at <mim@wanadoo.fr>; <<http://www.cosa-mentale.fr/MIM.html>>.
- [6] Gaston Bachelard, *L'air et les songes*, José Corti, ed. (Paris: Le livre de poche, 1943) p. 7.
- [7] Jean-Paul Sartre, *L'Imaginaire* (Paris: N.R.F., 1940).
- [8] Jean Dubuffet, *L'homme du commun à l'ouvrage* (Paris: Gallimard, 1973).
- [9] Special sections "*Graphismes et musique*," in *La Cité en revue*, No. 1 and No. 2 (directed by Mireille Courdeau), Marseille (1995) pp. 4-24; (1996) 2-11.
- [10] Wasilly Kandinsky, *Regards sur le passé et autres textes* (Paris: Hermann, 1974).
- [11] Sartre [7].
- [12] *La Cité en revue*[9].
- [13] *La Cité en revue*[9].
- [14] Pierre Boulez, *Le Pays fertile Paul Klee* (Paris: Gallimard, 1989).
- [15] *Des Arts face aux sciences, Actes du colloque* (Proceedings of the Colloquium) (Marseille: Editions le MIM, 1995).
- [16] See several of my articles published in *Leonardo*, from J. Mandelbrojt, "L'abstrait et le réel," *Leonardo* 2, No. 1 (1969) to J. Mandelbrojt, "In Search of the Specificity of Art," *Leonardo* 27, No. 3 (1994).
- [17] Jacques Mandelbrojt, *Les Cheveux de la réalité* (Nice: Editions Alliage, 1991).

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